

CHARGE NUMBER : 1804

PROGRAM TITLE : Expanded Tobacco - Process Improvement

PERIOD COVERED: August 1-31, 1981

PROJECT LEADER: R. G. Uhl

I. TOWER STUDIES (H. X. Nguyen)

Initial trials were conducted to evaluate the 4" x 14" rectangular expansion tower which replaced the 8" diameter round tower in the Phase III system. The rectangular cross-section was installed to reduce tobacco roping in the elbows, thereby improving heat transfer and product uniformity.

Runs made at the standard pilot process gas temperature of 600°F gave disappointing results, with tower exit OV's at 4-5% and equilibrated CV's at 55-60 cc/10 g. Tower temperatures were raised in increments up to a maximum of 740°F, with results showing that significantly higher temperatures (+100°F) were required to achieve CV parity with round tower product. However, the rectangular tower product results lie along the same CV versus tower exit OV and equilibrated CV versus equilibrated OV curves as round tower product, indicating that the higher temperature is necessary to obtain the same degree of tobacco thermal treatment.

Raising gas velocity from 75 to 175 fps caused a 10 unit product CV decrease, as opposed to a 10 unit increase for the same change made in the round tower. The rectangular tower had been fitted with a pronounced (75% area reduction) venturi feed section which caused large negative pressures at the feed throat and in the tangential separator, particularly at higher velocities. Reducing the tobacco feed rate had little effect on CV, but doubling the normal feed rate caused a 10-15 unit CV loss.

The venturi was replaced by a conventional feed section which reestablished the normal tower pressure profile. Higher gas temperatures were still required to achieve targeted CV levels. Velocity variation between 75 and 225 fps gave little change in tower exit OV or CV. Sieve fractions of the rectangular tower product show a long fraction 10 units higher than round tower product at the same tower exit OV. The standard 16" radius elbows have been replaced by the short (8") radius elbows with special I-R windows to attempt infrared measurement of tobacco particle temperatures.

Evaluation of the retractable arm sprayer was completed. Action of the arms was slowed by the low temperatures. Seal leakage caused partial retraction of the arms during impregnation, and the arms themselves lost strength and bent down under the tobacco load after a few batches. High actuation pressures were required to retract the arms from the tobacco bed. Nevertheless, although a total batch cycle could not be evaluated, visual observation indicated that this approach could reduce batch compaction if it could be made mechanically reliable.

Two of the three MC clumpbreakers have had their rotational speed reduced to 20 rpm. Samples are being taken for sieve analysis.

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II. HEAT TREATMENT (A. L. Johnson)

Experiments investigating tartaric acid and ammonium tartrate pretreatment of tobacco to reduce darkening were completed. There was no discernable difference in the color of pretreated and non-pretreated products. Product CV's were also similar (Eq. CV/OV = 45/9.5).

Thin and bodied portions of the DBC bright blend were treated separately to discern any differences in color and CV. For any given treatment time the bodied product was darker than the DBC blend, while the thin portion was essentially equivalent in color to the blend. The thin and bodied portions were as susceptible to "salt and pepper" coloring as the DBC blend itself. The thin portion of the blend lost its inherent 5 CV unit advantage during treatment, with both products having identical Eq. CV/OV values of 51/9.0.

III. PERKS (A. L. Johnson)

Efforts to scale-up the Project 1503 PERKS process continued. Additional preliminary trials showed that the processing of RKS at the desired 75% OV content is not feasible with the existing conveyor/dryer system due to losses from sticking to belts, etc. Tests showed that 55-60% would be a workable add-on level in this respect and that more concentrated lime slurries could be sprayed successfully. Pump and nozzle components of materials compatible with peroxide were received and installed.

A first effort at making a complete PERKS run was made using a more concentrated chemical spray (attained by reducing water addition to the slurry) in order to achieve the desired chemical add-on levels at an OV of 60%, both to facilitate handling of the RKS on the equipment and to reduce the sizable drying load (75% OV material would reduce dryer capacity to 10% of normal roaster throughput). Reactant mixture bubbling and ammonia evolution were much more pronounced in the concentrated mixture, and probably spent the peroxide. Project 1503 will attempt to provide a chemical addition system within the 60% OV constraint.

A. L. Johnson

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